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THE PLANT DISEASE REPORTER

Issued By

Division of Mycology and Disease Survey

November 15, 1936.

Volume XX Number 20

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE REPORTER

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DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XX November 15, 1936 Number 20

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RELATIVE PREVALENCE OF VARIOUS EAR ROT FUNGI IN THE 1933, 1934, AND 1935 CORN CROPS

P. E. Hoppe and J. R. Holbert

Included in this report are the results from a survey on the relative prevalence of various corn ear rot fungi in samples from the 1935 crop and a comparison of these results with those obtained from similar surveys on the 1933 and 1934 crops. The results from the previously reported surveys (P. D. R. 18:186-189 and 20:26-30) are repeated for comparison in view of the markedly different environmental conditions prevailing over the three-year period.

These surveys are made possible through the active cooperation of many representatives of the Federal Grain Supervision Service, Bureau of Agricultural Economics, U. S. Department of Agriculture, located in leading markets throughout the United States. The methods employed in these surveys briefly were as follows: samples from carload lots of known origin in which the quantity of damaged corn was an important factor in determining its numerical grade, were sent into the Chicago office from the important terminal markets. These samples were reviewed in Chicago and then transmitted to J. R. Holbert, Bloomington, Illinois, who examined the sound separates for general quality and evidence of immaturity. The samples then were sent to P. E. Hoppe at Madison, Wisconsin, who plated the damaged kernels and identified the fungi present in the damaged separates.

Results of 1935 Survey

Growing conditions were generally much better throughout the principal corn shipping areas in 1935 than they were during the 1934 drought year. As a consequence the 1935 survey was more extensive in area covered than the previous year's survey. The results from the platings of samples of the 1935 crop are summarized in Table 33. A brief discussion of the prevalence and distribution of the principal rot fungi recovered in the platings follows:

1) *Diplodia zeae*. In 1935 this fungus was of major importance as an ear-rotting organism only in the Atlantic Seaboard states. The percentages for *Diplodia* in the damaged separates in samples from Maryland and Delaware were 35.5 and 50.9 respectively. In Ohio the percentage of rotted kernels plating *Diplodia* dropped to 6.7. From Ohio westward the decline for *Diplodia* continued steadily. No cultures of *Diplodia* were recovered from any of the 24 samples from Nebraska and Colorado.

2) *Fusarium* spp. In this group are included all fusaria other than *F. graminearum*--the imperfect stage of *Gibberella saubinetii*. The species *F. moniliforme* predominated in this group. The distribution of *Fusarium* in

Table 33. Average percentages, by States, of principal ear-rot fungi recovered in plating damaged kernels from samples obtained from carload lots of corn arriving at terminal markets (1935 crop)

Origin of samples	Number carloads sampled	Diplodia zeae	Fusarium spp.	Gibberella saubinetii	Basisporium gallarum	Rhizopus spp.	Sterile kernels	Miscellaneous
Maryland	35	35.5	20.7	16.1	2.5	0	0.6	19.6
Delaware	18	50.9	15.1	12.1	2.8	0	0.6	18.5
Ohio	46	6.7	18.7	21.0	7.2	1.1	2.6	42.7
Indiana	30	4.6	15.3	13.4	13.5	0.5	2.7	50.0
Illinois	83	3.8	18.4	11.3	14.5	2.1	3.4	46.5
Iowa	68	3.7	38.7	9.1	13.9	1.1	2.8	30.7
Minnesota	42	1.5	30.7	5.8	27.8	3.0	5.1	26.1
South Dakota	16	0.4	41.7	1.3	23.2	7.6	3.0	22.8
Nebraska	9	0	46.8	0.2	0.7	14.0	7.1	30.2
Colorado	15	0	44.5	0	0	13.9	15.7	25.9

1935 contrasted directly with the situation as described for Diplodia. The maximum for Fusarium (46.8 percent) occurred in Nebraska samples. The figures for Fusarium dropped significantly east of the Mississippi, reaching a minimum of 15.1 percent in Delaware samples.

3) Gibberella saubinetii. This fungus was, relatively speaking, very important in 1935 over a widespread area of the Corn Belt. Gibberella was plated most frequently from samples from States east of Mississippi, with a maximum of 21.0 percent recorded for Ohio samples. From the standpoint of prevalence Gibberella was the most important single ear rot fungus in Ohio in 1935. South Dakota with 1.3 percent, Nebraska with 0.2 percent, and Colorado, from whose samples no Gibberella cultures were obtained, represent minimum figures for the 1935 distribution of this cosmopolitan parasite.

4) Basisporium gallarum. Basisporium occurred frequently in the 1935 platings for the first time during the three years of survey, ranking second in prevalence only to Fusarium in the samples from South Dakota, Minnesota, Iowa, Illinois, and Indiana. Minnesota with 27.8 percent, and Colorado with none, represented the extremes in the prevalence of Basisporium.

5) Rhizopus spp. Appreciable percentages of Rhizopus were obtained only in the samples from South Dakota, Colorado, and Nebraska. The maximum (14.0 percent) was reached in Nebraska. Rhizopus has never been plated from samples originating in Maryland or Delaware during any of the three years the present survey has been in progress.

6) Miscellaneous. The miscellaneous group listed in the table consisted mainly of unidentified fungi and bacteria as well as some fungi which were identified but whose limited prevalence did not warrant their establishment in individual classes. These were in the main fungi which generally are considered to be saprophytic or weakly parasitic in their ear rot relationships. Among those commonly plated were species of Penicillium, Aspergillus, Chaetomium, Epicoccum, and others of like nature. As shown in the table the miscellaneous forms were especially prevalent in the Ohio, Indiana, and Illinois samples. In these states the miscellaneous forms, in their aggregate, outranked in prevalence any of the other fungi listed in the table.

Comparison of Survey Results in 1933, 1934, and 1935.

A graphic representation of the plating results obtained from the 1933, 1934, and 1935 crops, for ten States, is shown in Figure 51. These graphs show not only the very marked regional differences in the distribution of the ear rot fungi in given years, but also equally striking differences for given regions in different years. Maryland and Delaware only have had no important changes during the three-year period. Diplodia has been in all three years the predominant fungus plated from the samples coming from these Seaboard States. Gibberella and Fusarium also have been consistently isolated from these eastern samples.

The results from mid-west Corn Belt states on the other hand show very pronounced inter-annual changes during the same three-year period. Data for Indiana are cited as generally representative of the mid-west region. The 1933 samples from Indiana averaged 62 percent Diplodia and 8 percent Fusarium--the second ranking fungus. In 1934 Diplodia dropped to 21 percent while Fusarium increased to 46 percent, reciprocally compensating each other. The 1935 results showed decreases for both Diplodia and Fusarium, the former dropping to 4.6 percent, and the latter to 15.3 percent. These decreases were compensated for by increases in Gibberella, Basisporium and in the miscellaneous fungi.

The very marked fluctuations, from year to year, in the prevalence of the various ear rot fungi as indicated in the results described above, directs attention again to the importance of environment as it affects the development of these different ear rot diseases. Growing conditions in the Middle West were not characterized in 1933 by any widespread conditions that were particularly unusual or abnormal. This region in 1934, however, was affected severely by the drought and by a very heavy epidemic of corn ear worm. At least a part of the explanation for the large increases in Fusarium in 1934 can safely be ascribed indirectly to the ear worm injury, since it is well established that Fusarium infection very frequently follows ear worm damage in the ears.

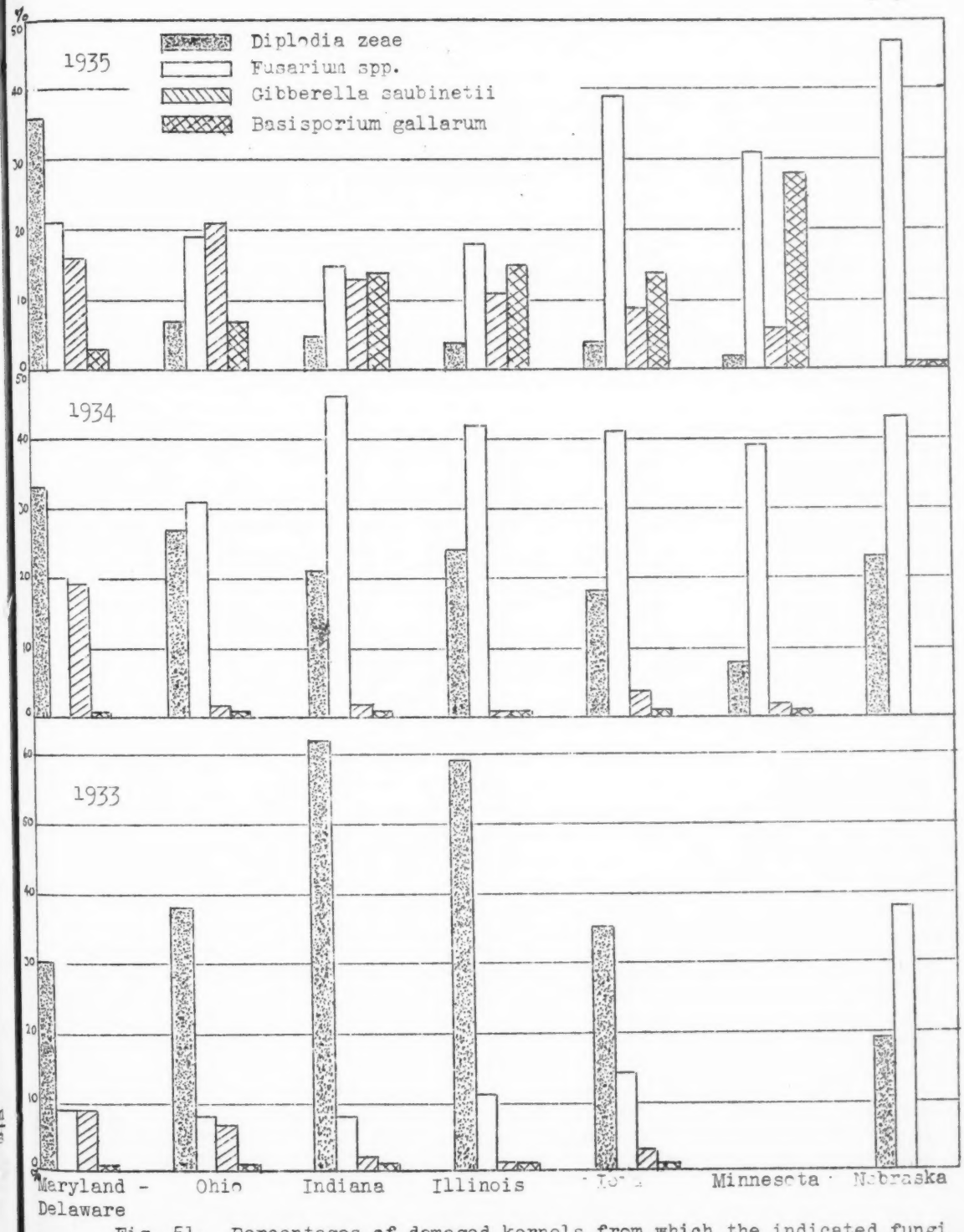

Fig. 51. Percentages of damaged kernels from which the indicated fungi were recovered in platings of these kernels from samples from carload lots of corn arriving at terminal markets. The data for 3 years and 7 locations show large inter-annual and inter-regional differences.

Due to late planting in many sections and to early killing frosts throughout most of the Corn Belt the 1935 crop failed generally to reach complete maturity. This condition favors Basisporium infection, and the large increases for Basisporium in 1935 were therefore not entirely unexpected. The large increases for Gibberella in 1935 are of interest in view of the unusually heavy and widespread Gibberella perithecial development noted by Dickson and Bowman (unpublished data) during a barley scab survey conducted in July. In addition to the favorable environment for the production of the inoculum, the environment following the pollination period must also have been favorable for infection and ear rot development.

The factors mentioned in the preceding paragraphs which apparently influenced the seasonal fluctuations in the different ear rots are links in the chain of a succession of environmental events necessary for the development of these various diseases. Environment as it affects both the host and the parasite needs to be more closely studied before the epidemiology of these economically important diseases is more fully understood. In the meantime it is hoped that the survey, by means of the terminal market method, may be continued over an extended period of years. The disease data, together with meteorological data for the same years, should in itself provide at some later date interesting material for study on the relationships between environment and the different corn ear rot diseases. (Division of Cereal Crops and Diseases).

INCIDENCE OF EAR ROTS IN THE 1935 CORN CROP

Neil E. Stevens

The value of any series of comparable disease estimates obviously increases with the addition of each season's observations. The results of the June 1936 "Total Damaged Corn Survey" (crop of 1935) are summarized in this note. The method of assembling and presenting the data is the same as in the earlier reports (P.D.R. 19:71-93 and 20:63-71), of which this is essentially a continuation.

By memorandum of May 6, R. T. Miles, in charge of general field headquarters, Grain Division, Bureau of Agricultural Economics, U. S. Department of Agriculture, requested each district field office to ask inspectors to determine, "during the month of June, 1936, the percentage of total damaged kernels in all corn receipts from country points, excluding shipments from terminal markets."

June is selected because, as explained in the first paper of this series (P.D.R. 19, page 72), the experience of many years indicates that by June the corn is so fully dried out that both test weight per bushel and percent moisture have become unimportant as grading factors, with the

result that grades are determined chiefly by total damage. Moreover, those familiar with market conditions are agreed that total damage is so largely made up of diseased kernels that the figures for total damage give a very accurate measure of the amount of disease in the inspected grain. Although the figures actually submitted by the Grain Division for study give the total damage in whole percents, they are here presented only as percentage of cars which showed 5 percent or more total damage. Since September 1, 1934, 5 percent has been the maximum limit of total damage for Grade 2 corn according to the official U. S. Grain Standards.

Reports of Licensed Inspections as a Source of Information Regarding Ear Rots

Since they deal only with corn which reaches terminal markets, these licensed inspections have the probable limitation of not reflecting the variations in the amount of corn so badly diseased as never to leave the farm. On the other hand, as an objective measure of the amount of disease in corn which reaches terminal markets, they are of very high order. They represent the work of a large number of trained and experienced observers who have none of the prejudices which might result from a study of certain diseases or areas. Their high degree of accuracy over a large area, for a series of years is discussed in the Grain Inspectors' Letter for August, 1936, under the heading "Some grain inspection statistics." This summary may profitably be read by anyone interested in this general subject. Among other things it is here pointed out that for the years 1930 to 1935 inclusive, over 90 percent of all inspections reviewed by supervisors were found to be correctly graded.

The map, Figure 52, gives the percentage of cars of shelled corn showing over 5 percent total damage received during June, 1936 at the following terminals: Cedar Rapids, Burlington, Clinton, Des Moines, Iowa; Cairo, Peoria, Decatur, Champaign, East St. Louis, Illinois; Cincinnati, Toledo, Circleville, Ohio; Denver, Colorado; Fort Worth, Waco, San Antonio, Texas; Indianapolis, Terre Haute, Indiana; Atchison, Topeka, Kansas; Kansas City, St. Joseph, St. Louis, Missouri; Louisville, Kentucky; Omaha, Columbus, Nebraska; and Nashville, Tennessee. As in the earlier summaries, such markets as Chicago, Buffalo, and Milwaukee, which regularly received shipments from a wide area, are omitted.

Comparison of the map for 1935 with that for 1934, shows that an increase in the percentage of cars having over 5 percent total damage occurred in Ohio, Iowa, Missouri, Kansas, Nebraska, Colorado, and Texas, whereas Indiana and Illinois showed a decrease as compared with the previous year.

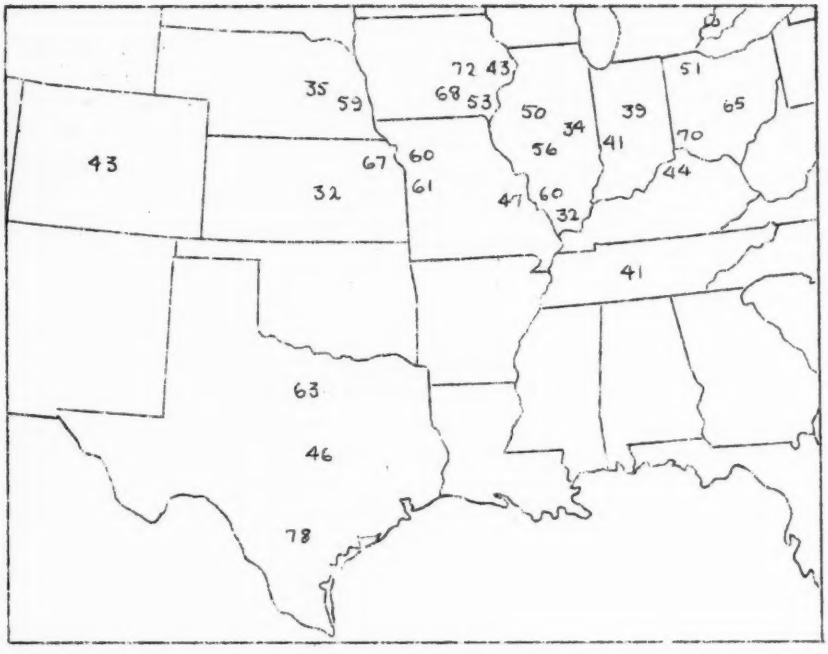

Fig. 52. June 1936 receipts, 1935 crop. Percentage of cars of shelled corn showing 5 percent or over total damage.

That these figures represent at least in part, the result of actual differences in the prevalence of ear rots, and not accidental differences due to market conditions, is indicated by the fact that both Indiana and Illinois reported to the Plant Disease Survey, lower losses from ear rots in 1935 than in 1934. The figures* are: Indiana, 6.0--1934, 1.6--1935; Illinois, 14.6--1934, 5.6--1935; Iowa, 6--1934, 7--1935.

The average number of cars showing more than 5 percent total damage for all cities listed in the text is 59 percent, the highest for any year since 1926 (Fig. 53). In contrast to this, the "Estimates of Crop Losses" for 1935 recently published by the Plant Disease Survey (P.D.R. Sup. 94, pages 452-453) show a drop in the estimated losses from corn ear rots to about the 1933 level.

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*These figures are based on the assumption (made on the advice of Dr. Benjamin Koehler) that approximately three-fourths of the loss estimated as caused by Diplodia in the 1934-35 reports may be considered as due to ear rot. Prior to 1934 all ear rots were reported together. Since then, one set of figures reports "Ear Rots (except Diplodia)" and another, "Diplodia" including both ear and stalk rots.

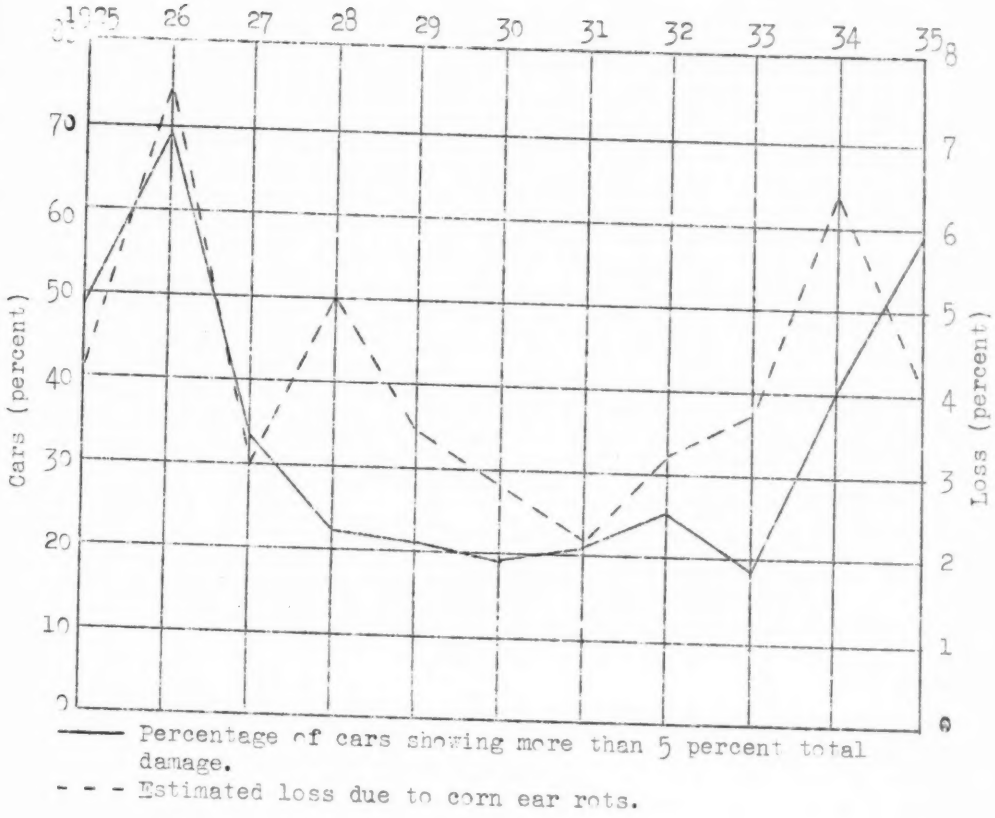

Figure 53. Incidence of corn ear rots in the various crops as indicated by the percentage of cars of shelled corn received at terminals listed in the text, showing over 5 percent total damage in June of the following year, and estimated loss due to corn ear rots for the United States as a whole, as reported by collaborators of the Plant Disease Survey.

With regard to this divergence between the two sets of figures, Dr. M. T. Jenkins says in a recent letter, "....especially in Illinois, Indiana, and Ohio, there was very little ear rot in the corn at harvest time last fall. In fact there was so little rot in the uniform Krug topcrosses that we did not get much information out of our total damage determinations. Apparently, most of the rot occurring in the June shipments must have developed during storage. For this reason your data for June 1936 could not be expected to tally very well with estimates of damage that were made in the fall of 1935." This statement at once corroborates the estimates by the collaborators of the various States and raises

again the question of the importance of the development of corn ear rots in storage--a quantity which has apparently never been satisfactorily measured. Dr. Jenkins further comments, "The data on the 1935 crop are particularly interesting to me in emphasizing that many factors contribute to the final quality of the corn crop as it reaches the terminal markets." The crop as it went into storage was relatively free from disease. The conditions of storage, mainly owing to high moisture content, apparently were such as to permit excessive deterioration during the storage period. It is possible that some of the divergencies between the estimates of losses from disease and actual losses based on the June data noted in the earlier reports may be due to similar unusual conditions (P.D.R. 19:71-93 and 20:63-71). The studies of the relative prevalence of the various ear rot fungi in the last three corn crops summarized in the preceding paper by Hoppe and Holbert, show clearly that as regards the fungi causing most of the decay, the drop here discussed (1935) differed markedly from at least the two preceding crops. (University of Illinois).

PERSISTENCE OF CERATOSTOMELLA ULMI IN STUMPS OF ERADICATED DUTCH ELM DISEASED TREES IN NEW JERSEY

T. W. Graham

In the Dutch elm disease eradication program the common practice is to cut and burn the tops of all diseased trees, but the stumps are left in the ground and must be treated to prevent sprouting. In 1933 and 1934 the method of stump treatment was to remove the bark from the stumps to well below the ground level and paint the exposed surface with creosote. This was done in an effort to prevent sprouting and to minimize the possibilities of the fungus fruiting on the surface of the stumps.

During April and May, 1936, a survey of the Dutch elm disease work area in New Jersey was made to obtain information on the persistence of Ceratostomella ulmi in stumps of previously diseased elm trees treated in the above manner, and the prevalence of living roots and sprouts on the stumps. This survey included only stumps from diseased trees eradicated in 1933 and 1934. The fungus had not necessarily been present in all stumps since in some eradicated trees the diseased portion may have been confined to limbs in the tops of trees. In this study stump locations were chosen at random over the entire disease area of New Jersey including swamp land, wood lots, and park and lawn locations.

Samples for culturing were taken in most cases from the discolored sapwood of the aboveground portion of the stumps. Occasionally, however, samples from the roots were taken where discoloration of the sapwood was present in the roots. In all instances samples were taken coincident with discoloration wherever it occurred in the stump. The point of origin of

Table 34. Results of examining stumps and culturing stump samples of eradicated Dutch elm diseased trees for the presence of living Ceratostomella ulmi and the prevalence of viable roots and sprouts

Condition of Stump	Tree removed in 1933: Number stump samples cultured	1933: Number & percent yielding C. ulmi	Tree removed in 1934: Number stump samples cultured	1934: Number & percent yielding C. ulmi	Total: Number stump samples cultured	Total: Number yielding C. ulmi	Total: Percent yielding C. ulmi
Sprouted[1]	2	1 - 50	61	11 - 13.0	63	12	19.0
Wholly or partly alive-no sprouts	0	0 - 0	28	9 - 32.1	28	9	32.1
Dead	19	0 - 0	128	6 - 4.6	147	6	4.0
Unknown[2]	0	0 - 0	168	19 - 11.3	168	19	11.3
Total	21	1 - 4.7	385	45 - 11.6	406	46	11.3

[1] None of the sprouts growing from diseased stumps had sapwood discoloration and no attempt was made to culture C. ulmi from them. Cases of invasion of sprouts by C. ulmi from stumps have been observed, however.

[2] Some of these samples were sent to the laboratory through the cooperation of the field supervisors of the U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine in the eradication program of the Dutch elm disease. Field observations were not made on stumps from which these samples came.

samples as to whether from living or dead parts was not considered, and samples were not separated on such a basis when cultured. Most of the samples, however, were taken from dead parts of the stump, since live parts were usually limited to one or more roots. At the time of sampling notes were taken on the presence of living sprouts and roots. Samples, when cultured, were plated out on potato-sucrose agar. Usually 30 to 60 chips were taken from each sample and the plates were incubated at 25° C. for 4 days, after which preliminary readings were made. All plates were then held 6 to 8 days longer at room temperature (21° to 24° C.) and again examined for the presence of the causal organism. The results obtained from culturing samples and the data from field observations are presented in Table 34.

Of the 406 attempts to isolate C. ulmi from stumps of trees removed two and three years previously, 11.3 percent of the trials yielded the organism. Of all the stumps on which field observations were made, C. ulmi was isolated from 23.1 percent of the living stumps but from only 4.4 percent of the dead stumps. Since all isolations were attempted on agar plates only the results for dead stumps may be too low. There still remains a significant difference however, after allowance is made for the difficulties of isolating the fungus from dead wood by the agar plate method. Although the results show that C. ulmi may remain alive in stumps three years, the fungus apparently dies out in a high percentage of cases after two or three years.

Of the 238 stumps examined in the field 26.4 percent were sprouted. Although a careful search was made none of the sprouts were found to be infected with C. ulmi, but such infection has been observed under other circumstances. Nevertheless, the fungus was isolated from 19 percent of the stumps producing sprouts, which indicates the possibility of the fungus being reproduced in the sprouts of previously diseased elms. The limited number of stumps examined however, does not indicate just how important sprouts may be in reproducing the disease.

Experiments in the treatment of stumps with copper sulphate are in progress. Although the data available at present are limited, preliminary results indicate that proper treatment with copper sulphate kills a very high percentage of the stumps and reduces the period of survival of C. ulmi in them. (Emergency Conservation Work, Divison of Forest Pathology, Bureau of Plant Industry).

MISCELLANEOUS NOTES ON THE DUTCH ELM DISEASE

Dutch elm disease infection at Branford, Connecticut.--One of the most outstanding single infection discoveries of this season involves a 6-inch elm at Branford, New Haven County, Connecticut. This location is approximately half way between the major infected zone in Fairfield County and the isolated point where four confirmed trees were found at Old Lyme.

Discovery of this tree is the first indication that the disease exists in the intervening stretch of approximately 55 miles between the two areas. This tree exhibits discoloration in annual rings prior to 1936, indicating the probability that the fungus entered the tree several years ago. A preliminary elm census in the adjoining territory shows approximately 26,000 elms within a 5-mile radius of the confirmed tree. Of this census, over half the elms are within a 1-mile radius. Within this mile radius there are between 3,000 and 4,000 dead or more-than-half-dead elms, in some of which engravings of Hylurgopinus rufipes Eich. were found.

Smaller European elm bark beetle found in West Virginia and Ohio.--Scolytus multistriatus Marsh. was recently found to be established in Parkersburg, West Virginia, by the Bureau's Dutch elm disease eradication unit. C. H. Hoffman, of the Morristown, New Jersey, laboratory, spent the latter part of September scouting in the country surrounding Parkersburg to determine the limits of the infested area. By the end of September the species had been found over an area approximately 100 miles in diameter and covering parts of West Virginia and Ohio. The beetle had previously not been reported from either State.

Does 17-year Cicada transmit Dutch elm disease?--During 1936 the 17-year locust was abundant at certain points in New Jersey. Because of the oviposition punctures the females make in the twigs and small branches of various trees, including elm, it was thought that they might act as transmitters of the Dutch elm disease fungus. During the latter part of June adults were collected at Trenton, New Jersey. They were placed in an outdoor cage at the Morristown, New Jersey, laboratory. Freshly cut branches of an elm affected with the disease were placed in the cage. Fifty-three females found ovipositing in the branches were removed immediately after each had inserted most of the ovipositor into the wood. The ovipositors were removed from these females and cultured by the Division of Forest Pathology, Bureau of Plant Industry. The fungus was not recovered from any of the ovipositors. Eight samples of the branches were later cut and submitted for culturing. Although the branches were very dry at the time, the fungus was obtained from four of the samples. (Bureau of Entomology and Plant Quarantine).

PROGRESS OF FRUIT TREE DISEASE ERADICATION CAMPAIGNS

Phony peach tree removal intensified in Georgia.--Over 60,000 "phony" trees were removed from this important peach-producing State in the period from July 1 to September 19, as compared with about 40,000 in the entire fiscal year 1936. Eradication is also under way in Alabama, Arkansas, Illinois, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Texas.

Citrus canker inspection.--Although several properties in the Galveston area of Texas showed some recurrent infections of canker on seedlings, on being reinspected in August and September, no canker was found in Jefferson County when reinspection was made in August in the vicinity of the six properties near Hamshire, which last winter were found to be badly infected with canker. All citrus trees were destroyed in the course of inspection. Twenty-one counties in Texas have been inspected since the first of July by the corps of Federal and State inspectors and no canker has been found outside the counties of Galveston, Brazoria, and Harris. Inspection has recently been started in Alabama and Mississippi. In Louisiana the reinspection of eight parishes since July 1 resulted in finding no infections, with the exception of the case of canker found on an island in Terrebonne Parish in July. (Bureau of Entomology and Plant Quarantine).

STRAWBERRY DWARF IN MASSACHUSETTS

O. C. Boyd

Strawberry beds in Falmouth were examined on October 21 in order to learn more about the fall condition of this nematode disease caused by Aphelenchoides fragariae . In the past seasons when the disease was outstanding with an abundance of nemas and eggs in the spring, there had been only slight or no indication of its presence in the same beds in the preceding fall. The same situation apparently exists this fall, for only an occasional plant with dwarf symptoms could be found even in fields where the source of plants was a heavily affected bed last spring. And even in these few diseased plants, Dr. J. R. Christie of the Division of Nematology, Bureau of Plant Industry, who has been cooperating in the project, was unable to find a single nematode of the dwarf species. It still remains a mystery how to explain the extremely heavy population of the dwarf nematodes in the diseased plants early in the spring even before the plants have made appreciable growth. (Massachusetts Agricultural Experiment Station).

DISEASES OF HERBACEOUS ORNAMENTALS IN NEW YORK IN 1936

P. P. Pirone

The following list also includes a few diseases reported from other States.

ACONITUM sp.

Heterodera marioni (Cornu) Goodey, root knot submitted from Vermont.

ALTHEA ROSEA

Cercospora althaeina Sacc., leaf-spot, collected at Ithaca for the first time in 20 years.

Puccinia malvacearum C. C. Bert., rust.

AMPELOPSIS TRICUSPIDATA
Guignardia bidwellii (Ell.) Viala & Ravaz, leaf-spot.

ANEMONE SYLVESTRIS
Heterodera marioni (Cornu) Goodey, root knot.

ANTIRRHINUM MAJUS
Puccinia antirrhini Diet. & Holw., rust.

CALLISTEPHUS CHINENSIS
Coleosporium solidaginis (Schw.) Thüm., rust.
Fusarium conglutinans callistephi Beach, wilt.
Yellows (virus).

CHRYSANTHEMUM sp.
Cylindrosporium chrysanthemi Ell. & Dearn., leaf-spot.
Erysiphe cichoracearum D.C., powdery mildew.
Puccinia chrysanthemi Roze, rust.
Yellows (aster yellows virus).

DAHLIA sp.
Botrytis sp., bud-rot.
Erysiphe cichoracearum D.C., powdery mildew.
Fusarium sp., wilt.
Stunt (virus).

DELPHINIUM sp.
Botrytis sp., grey-mold.
Heterodera marioni (Cornu) Goodey, root knot.
Sclerotium delphinii D. S. Welch, crown rot.

DIANTHUS CARYOPHYLLUS
Alternaria dianthi Stev. & Hall, branch rot.
Corticium vagum Berk. & Curt., stem-rot.
Fusarium sp., wilt.
Uromyces caryophyllinus (Schrank) Wint., rust.

GYPSOPHILA sp.
Bacterium gypsophilae N. A. Brown, gall; from New Jersey.

IRIS sp.
Bacillus carotovorus L. R. Jones, soft-rot.
Didymellina iridis (Desm.) Hoehn., leaf-spot.

LATHYRUS ODORATUS
Cladosporium album Dowson, leaf-mold; in greenhouses.
Corticium vagum Berk. & Curt., root-rot.
Mosaic (virus).

LILIUM spp.
Botrytis cinerea, gray-mold.
Mosaic (virus).

PAEONIA sp.
Botrytis paeoniae Oud., blight.
Cladosporium paeoniae Pass., leaf-blotch.
Mosaic (virus).
Sclerotinia sclerotiorum (Lib.) Mass., stem-rot.

PELARGONIUM sp.
Botrytis cinerea Auct., Botrytis leaf-spot.
Cutting-rot, caused by several organisms.

PETUNIA
Mosaic (virus).

PHLOX
Pyrenochaeta phloxidis Massee, stem-blight.
Septoria divaricata Ell. & Ev., leaf-spot.
Sphaerotheca humuli (DC.) Burr., powdery mildew.
Leaf-blight, cause undetermined.

PHYSALIS FRANCHETI
Mosaic (virus).

TULIPA sp.
Botrytis tulipae (Lib.) F. F. Hopkins, Botrytis blight.

ZANTEDESCHIA sp.
Phytophthora richardiae Buis., root-rot.
(New York State College of Agriculture).

LEAF SPOT OF CHRYSANTHEMUM

Thelma B. Post

Septoria obesa Syd. was the cause of a destructive leaf spot on chrysanthemums collected on Long Island in October 1936. These chrysanthemums were of the variety Legal Tender, and were grown in outdoor beds under aster cloth shelters. (Division of Fruit and Vegetable Crops and Diseases).

BEAN RUST SEVERE IN EASTERN VIRGINIA

Harold T. Cook

Rust (Uromyces phaseoli typica) has been unusually severe on the snap bean crop on the Eastern Shore of Virginia and in the vicinity of Norfolk this fall. Nearly all of the beans grown in this area are of the Bountiful variety which in the past has suffered practically no damage from rust. The first report of rust this year was on August 29 from the Eastern Shore, where it had already caused considerable injury to a 14-acre field of early fall beans. It continued to cause damage in practically every bean field in this area until the end of the season about November 1. A considerable number of growers dusted or sprayed their fields with sulphur for powdery mildew and red spider, but rust caused as much damage in these fields as in those that were untreated. (Nov. 1, Virginia Truck Experiment Station).

POTATO LATE BLIGHT IN EASTERN VIRGINIA

Harold T. Cook

Late blight (Phytophthora infestans) was found in three fields of potatoes of the North Dakota Red variety in Princess Anne County today. The foliage was almost completely destroyed in one six-acre field and partially destroyed in another six-acre field and a three-acre field. This is the first time that I have found late blight of potatoes in this area. (Nov. 3, Virginia Truck Experiment Station).

A CORRECTION

On page 301 of the preceding issue of the Reporter, the name of the pea scab fungus should have been written Cladosporium pisicola, instead of pisicolum.

OCTOBER WEATHER

October had mostly mild temperatures and a decidedly spotty distribution of rainfall. Fig. 54 shows that the temperature averaged somewhat above normal in most sections east of the Mississippi River, and also from the Rocky Mountains westward. In the interior of the Pacific States the month was from 3° to 7° warmer than normal, and in the Atlantic area mostly from 1° to 3° warmer. Between the Mississippi River and Rocky Mountains there was a general tendency to subnormal temperatures, the largest deficiencies being in the southern portion of the area. Also, in the western

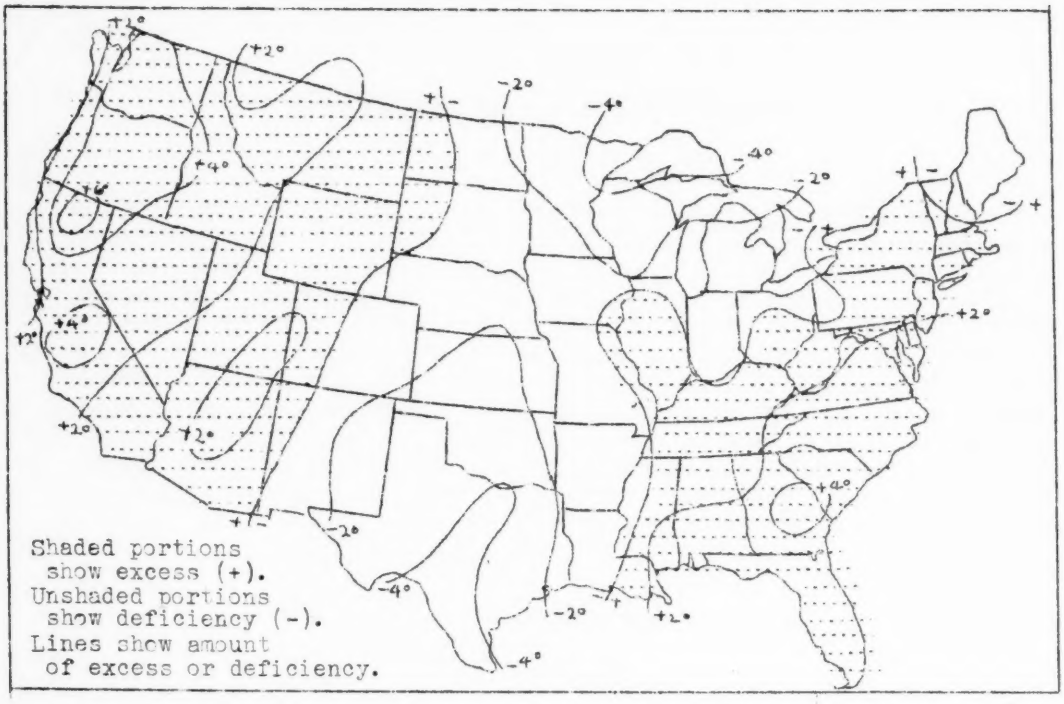

Fig. 54. Departure of Mean Temperature from the Normal for October 1936.

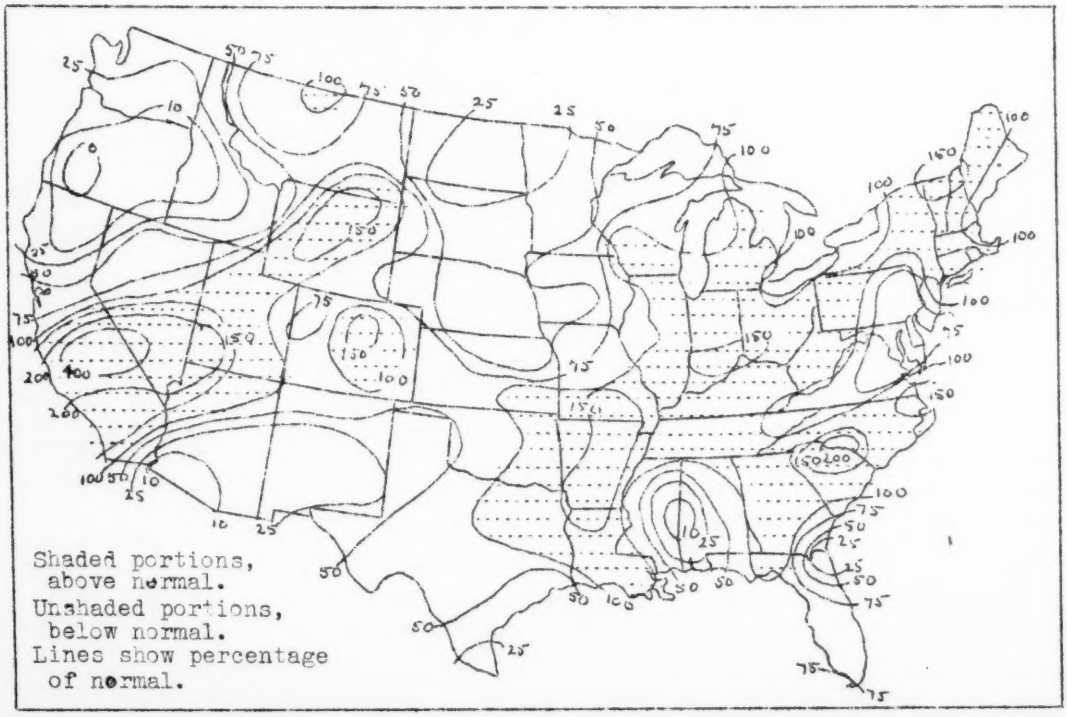

Fig. 55. Percentage of Normal Precipitation for October 1936.

upper Lake region the month was from 2° to 5° colder than normal. In interior sections the first general freeze of the season occurred the latter part of the month, and at the same time some of the lowest October temperatures of record were reported from the Northeast.

Fig. 55 shows that precipitation was very unevenly distributed. East of the Mississippi River, except for local areas in the South and the Middle Atlantic States, the monthly totals were generally above normal, being decidedly in excess in the Ohio Valley. Between the Mississippi River and Rocky Mountains the tendency was to subnormal rainfall, markedly so from western Missouri and northern Kansas northward. The northern Great Plains continued dry throughout the month, with considerable sections having less than 25 percent of normal precipitation.

Most of the southern part of the Pacific area had abnormally heavy rain, but the north was extremely dry, with much of Idaho, northern California, Oregon, and Washington having less than one-fourth the monthly normal; large areas had less than 10 percent of normal. Another area, centering in southern Arizona and extending eastward into New Mexico, had very little precipitation during the month. (Weekly Weather and Crop Bulletin, week ending Nov. 3).